Long-term Groundwater Monitoring Program, December 2016 Event for Monthly Sampling Red Hill Bulk Fuel Storage Facility, JBPHH, HI

Monday, December 12, 2016, to Thursday, December 15, 2016 [a]

IMPORTANT EVENT NOTES

1) Sampling events are performed by three teams: 1 inside-tunnel team, 1 outside-tunnel team, and 1 sample packing/shipping team.

2) The Navy collects, prepares, and handles groundwater samples in accordance with the standard operating procedures (SOPs) presented in the *Project Procedures Manual* (DON 2015).

3) Groundwater samples collected before 1100 are prepped, packed, and shipped **same-day via FedEx due to short holding times for nitrate analysis (48-hour hold time)**.

4) **All sample coolers must be submitted to FedEx no later than 1530 for same-day shipping**.

5) Groundwater samples collected after 1100 are stored overnight at the AECOM warehouse then prepped, packed, and shipped via FedEx the next day.

SAMPLING & ANALYSIS NOTES

1) Groundwater samples are analyzed by a Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)-certified analytical chemistry laboratory.

   - Laboratory QC samples will include method blanks, laboratory control samples, matrix spikes/matrix spike duplicates (MS/MSDs), and duplicates as described in the DoD Quality Systems Manual (QSM) Version 5.0 (DoD 2013).

2) Analytical laboratory results are validated by a third-party data validation firm.

   - Third-party data validation consists of standard validation (90 percent) and full validation (10 percent), ensuring the laboratory has complied with the requirements outlined in both the analytical methods and the DoD QSM (DoD 2013).

   - Additionally, analytical data are validated by a third-party data validation firm in accordance with NAVFAC Pacific Environmental Restoration Program Data Validation Procedures (DON 2015).

Table 1: Current COPC List for and Screening Criteria for AOC Statement of Work Sections 6 and 7 Investigation, Red Hill Bulk Fuel Storage Facility, JBPHH, HI

Parameter	Analytical Method	Analyte(s)	Screening Criterion (µg/L)
TPH	EPA SW-846 8015	TPH-g	100
		TPH-d	100
		TPH-o	100
TPH with Silica Gel Cleanup	EPA SW-846 3630/ 8015	TPH-d	100
		TPH-o	100
VOCs	EPA SW-846 8260	Benzene	5.0
		Ethylbenzene	30
		Toluene	40
		Total Xylenes	20
PAHs	EPA SW-846 8270 SIM	1-Methylnaphthalene	4.7
		2-Methylnaphthalene	10
		Naphthalene	17
NAPs	Field parameter	Dissolved Oxygen	—
	SM 3500-Fe	Ferrous Iron	—
	RSK 175M	Methane	—
	EPA 300.0	Nitrate, Sulfate, Chloride	—
	SM2320	Alkalinity (bicarbonate, carbonate, and total alkalinity)	—
Lead Scavengers	SW-846 8260	1,2-Dibromoethane	0.04
		1,2-Dichloroethane	5.0
Fuel Additives	SW-846 8270	Phenol	5.0 [a]
	Lab Procedure	2-(2-methoxyethoxy)-ethanol	800 [b]
Groundwater Chemistry (Major Ions and Silica)	EPA 300.0	Bromide, chloride, fluoride, and sulfate	—
	EPA SW-846 6010	Total calcium, total magnesium, total manganese, total potassium, and total sodium	—
	SM4500-SID	Total and dissolved silica	—

Note: COPC screening criteria were provided in the February 4, 2016 scoping completion letter.

— no criterion
µg/L microgram per liter
PAH polynuclear aromatic hydrocarbon
TPH total petroleum hydrocarbons
TPH-d total petroleum hydrocarbons – diesel range organics
TPH-g total petroleum hydrocarbons – gasoline range organics
TPH-o total petroleum hydrocarbons – residual range organics (i.e., TPH-oil)

[a] Screening criterion from DOH Tier 1 EALs, Table D-1b, Groundwater Action Levels (groundwater is a current or potential drinking water resource, and surface water body is not located within 150m of release site) (DOH 2016a).

[b] Screening criterion from EPA Tap Water Regional Screening Levels, THQ=1.0, May 2016 (EPA 2016).

DECEMBER 2016 - APRIL 2017 GWM EVENT

RHMW01, RHMW02, RHMW03, RHMW05, and RHMW04, RHMW06, RHMW07, OWDFMW01, HDMW2253-03, RHMW2254-01

Parameter	Containers (per sample)	Total per Container Type (per sample)
VOCs by 8260	40-mL VOAs w/ HCl, Teflon-lined septum caps	4
TPH-g by 8260		
TPH-d, TPH-o by 8015	1 L amber unpreserved	6
PAHs (Naph, 1-&2-MN) by 8270 SIM		
SVOCs (phenol and 2-(2-methoxyethoxy)-ethanol) by 8270		
Methane by RSK 175	40-mL VOAs w/ HCl, Teflon-lined septum caps	2
Ferrous Iron by SM 3500-Fe	250-mL brown plastic w/ HCl (field filtered)	1
Nitrate, Sulfate and Chloride by EPA 300.0	250-mL plastic unpreserved	1

RHMW08 and RHMW09 (any newly installed wells)

Parameter	Containers (per sample)	Total per Container Type (per sample)
VOCs by 8260	40-mL VOAs w/ HCl, Teflon-lined septum caps	5
TPH-g by 8260		
DCA by 8260		
EDB by 8011	40-mL VOAs unpreserved, Teflon-lined septum caps	3
TPH-d, TPH-o by 8015	1 L amber unpreserved	6
PAHs (Naph, 1-&2-MN) by 8270 SIM		
SVOCs (phenol and 2-(2-methoxyethoxy)-ethanol) by 8270		
Methane by RSK 175	40-mL VOAs w/ HCl, Teflon-lined septum caps	2
Ferrous Iron by SM 3500-Fe	250-mL brown plastic w/ HCl (field filtered)	1
Nitrate, Sulfate and Chloride by EPA 300.0	250-mL plastic unpreserved	1

Equipment Blanks / Field Blanks

Parameter	Containers (per sample)	Total per Container Type (per sample)
VOCs by 8260	40-mL VOAs w/ HCl, Teflon-lined septum caps	5
TPH-g by 8260		
TPH-d, TPH-o by 8015	1 L amber unpreserved	6
PAHs (Naph, 1-&2-MN) by 8270 SIM		
SVOCs (phenol and 2-(2-methoxyethoxy)-ethanol) by 8270		

Trip Blanks

Parameter	Containers (per sample)	Total per Container Type (per sample)
VOCs by 8260	40-mL VOAs w/ HCl, Teflon-lined septum caps	4
TPH-g by 8260		
DCA by 8260		
EDB by 8011	40-mL VOAs unpreserved, Teflon-lined septum caps	3
Methane by RSK 175	40-mL VOAs w/ HCl, Teflon-lined septum caps	1

Mark Chain-of-Custody for EDB and DCA only if Trip Blank is associated with newly installed well

Parameters not analyzed during these events:

TPH-d, TPH-o w/ Silica Gel Cleanup by 3630 & 8015	1 wet season (Oct 2016), and 1 dry season (tentative Jul 2017)
Bromide and Fluoride by EPA 300.0	Groundwater chemistry to profile aquifer (sampled Nov 2016 event)
Total silica by SM4500-SID	
Total, bicarbonate, and carbonate alkalinity by SM2320B	
Dissolved silica by SM4500-SID	
Total calcium, total magnesium, total manganese, total potassium, and total sodium by 6010	